

ENVIRONMENTAL QUALITY

CHAPTER 74

OCCUPATIONAL HEALTH

Sub-Chapter 1

Noise and Air Contaminants

Rule 17.74.101 Occupational Noise

17.74.102 Occupational Air Contaminants

Sub-Chapter 2 reserved

Sub-Chapter 1

Noise and Air Contaminants

17.74.101 OCCUPATIONAL NOISE (1) The purpose of this rule is to establish maximum noise exposure levels that represent conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse effect on the ability to hear and understand normal speech. The public should note that the United States Occupational Safety and Health Act (OSHA) may have pre-empted the application of this rule to some work places.

(2) As used in this rule, the following definitions apply:

(a) "ANSI" means the American National Standards Institute of 1430 Broadway, New York, New York, 10018.

(b) "Continuous noise" means those variations of noise levels that involve maxima at intervals of 1 per second or less.

(c) "Impact or impulsive noise" means those variations of noise levels that involve maxima at intervals of greater than 1 per second.

(3) For purposes of determining compliance with this rule, noise levels shall be determined by a sound level meter which operates on the decibels A-weighting network (dbA) with slow meter response. The department hereby adopts and incorporates herein by reference the specifications for sound level meters adopted by the American National Standards Institute, ANSI S1.4-1971 (R1976). This sets forth nationally recognized standards for sound level meters. A copy of these specifications may be obtained by writing to ANSI at 1430 Broadway, New York, New York 10018. Inquiries as to whether a particular meter is satisfactory may be answered by contacting the Department of Environmental Quality, PO Box 200901, Helena, MT 59620-0901, telephone 444-3671.

(4) No person may cause or permit the exposure of any worker employed at any work place to noise levels in excess of the maximum noise exposure levels listed in (6) of this rule.

(5) When any worker employed at any work place is exposed to noise levels exceeding those listed in (6) of this rule, feasible administrative or engineering controls shall be utilized by the employer to reduce the noise levels. If such controls fail to reduce the worker's exposure to noise levels within the maximum permissible noise exposure levels listed in (6) of this rule, personal hearing protective equipment shall be provided by the employer to the worker and used to reduce the noise exposure level to within the maximum permissible noise exposure levels listed in (6) of this rule.

(6) The maximum permissible noise exposure levels to which a worker may be exposed are as shown in the following table:

Continuous or Intermittent Noise Exposures	
Duration per day in hours	Noise level (dbA)
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
3/4	107
1/2	110
1/4	115

(a) These values apply to the total time of exposure per working day regardless of whether this is 1 continuous exposure or a number of short-term exposures but does not apply to impact or impulsive type of noises.

(b) When the daily noise exposure of a worker is composed of 2 or more periods of noise exposure of different levels, their combined effect should be considered rather than the individual effect of each. If the sum of the following fractions: $C_1/T_1 + C_2/T_2 \dots C_n/T_n$ exceeds unity (1), then the mixed exposure should be considered to exceed the maximum permissible exposure rate. C_n indicates the total time of exposure at a specified noise level, and T_n indicates the total time of exposure permitted at that level. Noise exposures of less than 90 dbA do not enter into the above calculations. No worker may be exposed to continuous noise in excess of 115 dbA for any duration.

(c) A worker's exposure to impact or impulse noise shall not exceed 140 decibels (dbA) peak sound pressure level. (History: 50-70-106, 50-70-113, MCA; IMP, 50-70-103(8), 50-70-113, MCA; Eff. 12/31/72; AMD, 1980 MAR p. 3008, Eff. 12/12/80; TRANS, from DHES, 1996 MAR p. 433.)

17.74.102 OCCUPATIONAL AIR CONTAMINANTS (1) The purpose of this rule is to establish maximum threshold limit values for air contaminants under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects.

(a) The public is advised that regulations adopted by the United States secretary of labor pursuant to the federal Occupational Safety and Health Act (OSHA) may have pre-empted the application of some of these standards to certain workers in Montana. For those air contaminants for which an OSHA standard has been adopted, the OSHA standard applies to all workers in Montana except workers of state and local governments whose coverage is excluded by federal law and those workers whose work place is not of sufficient size to subject it to OSHA. For those air contaminants for which no OSHA standard has been adopted, the threshold limit values adopted by this rule apply to all workers in Montana.

(b) Threshold limit values for air contaminants are established in this rule as ceiling ("C") values, or as time-weighted average values.

(2) As used in this rule, the following definitions apply in addition to those in 50-70-103, MCA:

(a) "ANSI" means the American National Standards Institute, of 1430 Broadway, New York, New York, 10018.

(b) "Ceiling value" or an air contaminant preceded by a "C" means that for that air contaminant a threshold limit value has been established in this rule which value cannot be exceeded at any time, even briefly.

(c) "mg/m³" means approximate milligrams of particulate per cubic meter of air.

(d) "mppcf" means millions of particles per cubic feet of air based on impinger samples counted by light-field technics.

(e) "ppm" means parts of vapor or gas per million parts of contaminated air by volume at 25° Celsius and 760 mmHg pressure.

(f) "Time weighted average value" means that for an air contaminant for which such threshold limit value has been established in an 8-hour work shift a worker may be exposed to a single brief concentration which exceeds this value so long as the average 8-hour cumulative exposure as computed by the formula in (4) of this rule does not exceed this value.

(3) When any worker employed at any work place is or would be exposed to an air contaminant exceeding the threshold limit values of this rule, the employer shall determine and implement feasible administrative or engineering controls first to reduce the air contaminant levels. If such controls fail to reduce the worker's exposure to air contaminant levels within the threshold limit values of this rule, personal protective equipment shall be provided by the employer for the worker and used to reduce the worker's exposure to air contaminants within the levels

permitted by this rule. All personal protective equipment used for purposes of this rule must be approved for each particular use by a competent industrial hygienist or other technically qualified person. Whenever respirators are used as personal protective equipment, they must be satisfactory to the department. Questions as to whether respirators are satisfactory may be answered by contacting the Department of Environmental Quality, PO Box 200901, Helena, MT 59620-0901, phone (406)444-3671.

(4) A worker's exposure to any air contaminant listed in Tables I, II, or III of this rule shall be limited in accordance with the requirements of this subsection. The exposure of a worker is to be calculated in relation to a single air contaminant and also in relation to a combination or mixture of air contaminants in an 8-hour period.

(a) An employer shall use the following formula to compute a worker's cumulative or time weighted average exposure to a single air contaminant during an 8-hour work shift:

(i) $E = CaTa + CbTb + \dots CnTn/8$. "E" is the equivalent exposure for the working shift; "C" is the concentration during any period of time T where the concentration remains constant; and "T" is the duration in hours of the exposure at the concentration C. An employer shall not allow the value of E to exceed the 8-hour time weighted average limit in Tables I, II or III of this rule for the material involved.

(ii) To illustrate the formula prescribed in (i) above, note that isoamyl acetate has an 8-hour time weighted average limit of 100 ppm in Table I. Assume that an employee is subject to the following exposure: 2 hours exposure at 150 ppm; 2 hours exposure at 75 ppm; 4 hours exposure at 50 ppm. Substituting this information in the formula, we have $2 \times 150 + 2 \times 75 + 4 \times 50/8 = 81.25$ ppm. Since 81.25 ppm is less than 100 ppm, the 8-hour time weighted average limit, the exposure is acceptable.

(b) An employer shall use the following formula to compute a worker's cumulative or time weighted average exposure to a mixture or combination of air contaminants during an 8-hour work shift:

(i) $Em = C_1/L_1 + C_2/L_2 + \dots C_n/L_n$. "Em" is the equivalent exposure for the mixture; "C" is the concentration of a particular air contaminant; and "L" is the threshold limit value for that contaminant from Tables I, II, or III of this rule. An employer shall not allow the value of Em to exceed unity (1).

(ii) The following example illustrates the formula prescribed in (i) above. Assume that a worker was exposed to actual concentrations of 500 ppm of acetone as listed in Table I, 45 ppm of 2-Butanone as listed in Table I, and 40 ppm of toluene as listed in Table II, during an 8-hour period. The 8-hour time weighted average exposure limits for these air contaminants are 1000 ppm, 200 ppm, and 200 ppm, respectively.

Putting this data into the formula, $E_m = 500/1000 + 45/200 + 40/200$, or 0.925. Since E_m is less than unity (1), the exposure of the worker to the combination or mixture of air contaminants is acceptable.

(5) No person may cause or permit the exposure of any worker employed at any work place by inhalation, ingestion, skin absorption or contact to air contaminant levels in excess of the threshold limit values listed in this rule. Compliance with this rule shall be determined by calculating the worker's exposure to air contaminants as individual substances or as the exposure to a mixture of substances according to the formulas stated in (4) of this rule.

(a) The threshold limit values in Table I of this rule are to be interpreted as follows:

(i) A worker's exposure to any air contaminant in Table I, the name of which is preceded by a "C", e.g., C boron trifluoride, shall at no time exceed the threshold limit value listed which is expressed as a ceiling value for that air contaminant.

(ii) A worker's exposure to any material in Table I, the name of which is not preceded by a "C", shall not exceed the threshold limit value which is expressed as an 8-hour time weighted average.

(b) The threshold limit values in Table II of this rule are to be interpreted as follows:

(i) A worker's exposure to any air contaminant listed in Table II, in any 8-hour work shift of a 40-hour work week, shall not exceed the 8-hour time weighted average limit given for that air contaminant in Table II.

(ii) A worker's exposure to an air contaminant listed in Table II shall not exceed at any time during an 8-hour shift the acceptable ceiling concentration limit given for an air contaminant in Table II, except for a time period, and up to a concentration not exceeding the maximum duration and concentration allowed in the column under "acceptable maximum peak above the acceptable ceiling concentration for an 8-hour shift."

(iii) To exemplify (i) and (ii) above, during an 8-hour shift, a worker may be exposed to a concentration of benzene above 25 ppm, but never above 50 ppm, only for a maximum period of 10 minutes. Such exposure must be compensated by exposures to concentrations less than 10 ppm so that the cumulative exposure for the entire 8-hour work shift does not exceed a time weighted average of 10 ppm.

(c) The threshold limit values in Table III of this rule are to be interpreted as follows:

(i) A worker's exposure to any air contaminant listed in Table III, in any 8-hour work shift of a 40-hour work week, shall not exceed the 8-hour time weighted average limit given

for that air contaminant in Table III.

(ii) For respirable quartz of crystalline silica, the percentage of crystalline silica in the formula for mppcf or mg/m^3 is the amount determined from airborne samples, except in those instances in which other methods have been shown to the department's satisfaction to be applicable.

(iii) For respirable quartz of crystalline silica, both concentration and percent quartz for the application of the limit of mg/m^3 are to be determined from the fraction passing a size-selector with the following characteristics in Table A.

<u>TABLE A</u>	
Aerodynamics diameter (unit density sphere)	Percent passing selector
2	90
2.5	75
3.5	50
5.0	25
10	0

(iv) For non-asbestos forms of talc for silicates, the mppcf threshold limit value is to be used where less than 1% quartz exists but if greater than 1% quartz exists, the quartz threshold limit value in Table III is to be used.

(v) For all types of asbestos, the fibers per cubic centimeter level in Table III is to be determined by using the membrane filter method at 400 to 450 x (magnification) (4 millimeter objective) with phase contrast illumination.

(vi) An mppcf measurement may be converted into million particles per cubic meter and particles per cc by multiplying it by a factor of 35.3.

(d) The threshold limit values for air contaminants are listed in the following tables:

TABLE I

Air Contaminant	ppm	mg/m ³
Abate.....		15
Acetaldehyde.....	200	360
Acetic acid.....	10	25
Acetic anhydride.....	5	20
Acetone.....	1,000	2,400
Acetonitrile.....	40	70
Acetylene dichloride, see 1, 2-Dichloroethylene		
Acetylene tetrabromide.....	1	14
Acrolein.....	0.1	0.25
Acrylamide - Skin.....	---	0.3
Acrylonitrile - Skin.....	20	45
Aldrin - Skin.....	---	0.25
Allyl alcohol - Skin.....	2	5
Allyl chloride.....	1	3
C Allyl glycidyl ether (AGE).....	10	45
Allyl propyl disulfide.....	2	12
2-Aminoethanol, see Ethanolamine		
2-Aminopyridine.....	0.5	2
Ammonia.....	50	35
Ammonium sulfamate (Ammate).....	---	15
n-Amyl acetate.....	100	525
sec-Amyl acetate.....	125	650
Aniline - Skin.....	5	19
Anisidine (o.-p-isomers) - Skin.....	---	0.5
Antimony and compounds (as Sb).....	---	0.5
ANTU (alpha naphthyl thiourea).....	---	0.3
Arsenic and compounds (as As).....	---	0.5
Arsine.....	0.05	0.2
Azinphos-methyl - Skin.....	---	0.2
Barium (soluble compounds).....	---	0.5
p-Benzoquinone, see Quinone		
Benzoyl peroxide.....	---	5
Benzyl chloride.....	1	5
Biphenyl, see Diphenyl		
Bisphenol A, see Diglycidyl ether		
Boron oxide.....	---	15
Boron tribromide.....	1	10
C Boron trifluoride.....	1	3
Bromine.....	0.1	0.7
Bromine pentafluoride.....	0.1	0.7
Bromoform - Skin.....	0.5	5
Butadiene (1, 3-butadiene).....	1,000	2,200

Air Contaminant	ppm	mg/m ³
Butanethiol, see Butyl mercaptan		
2-Butanone.....	200	590
2-Butoxy ethanol (Butyl Cellosolve) - Skin...	50	240
Butyl acetate (n-butyl acetate).....	150	710
sec-Butyl acetate.....	200	950
tert-Butyl acetate.....	200	950
Butyl alcohol.....	100	300
sec-Butyl alcohol.....	150	450
tert-Butyl alcohol.....	100	300
C Butylamine - Skin.....	5	15
C tert-Butyl chromate (as CrO ₃) - Skin.....	---	0.1
n-Butyl glycidyl ether (BGE).....	50	270
Butyl mercaptan.....	10	35
p-tert-Butyltoluene.....	10	60
Calcium arsenate.....	---	1
Calcium oxide.....	---	5
Camphor.....	2	---
Carbaryl (Sevin □).....	---	5
Carbon black.....	---	3.5
Carbon dioxide.....	5,000	9,000
Carbon monoxide.....	50	55
Chlordane - Skin.....	---	0.5
Chlorinated camphene - Skin.....	---	0.5
Chlorinated diphenyl oxide.....	---	0.5
Chlorine.....	1	3
Chlorine dioxide.....	0.1	0.3
C Chlorine trifluoride.....	0.1	0.4
C Chloroacetaldehyde.....	1	3
a-Chloroacetophenone (phenacylchloride).....	0.05	0.3
Chlorobenzene (monochlorobenzene).....	75	350
o-Chlorobenzyliden malononitrile (OCBM).....	0.05	0.4
Chlorobromomethane.....	200	1,050
2-Chloro-1,3-butadiene, see Chloroprene		
Chlorodiphenyl (42% Chlorine) - Skin.....	---	1
Chlorodiphenyl (54% Chlorine) - Skin.....	---	0.5
1-Chloro,2,3-epoxypropane, see Epichlorhydrin		
2-Chloroethanol, see Ethylene chlorohydrin		
Chloroethylene, see Vinyl chloride		
C Chloroform (trichloromethane).....	50	240
1-Chloro-1-nitropropane.....	20	100
Chloropicrin.....	0.1	0.7
Chloroprene (2-chloro-1,3-butadiene) - Skin..	25	90

Air Contaminant	ppm	mg/m ³
Chromium, sol. chromic, chromous salts as Cr.....	---	0.5
Metal and insol. salts.....	---	1
Coal tar pitch volatiles (benzene soluble fraction) anthracene, BaP, phenanthrene, acridine, chrysene, pyrene.....	---	0.2
Cobalt, metal fume and dust.....	---	0.1
Copper fume.....	---	0.1
Dusts and mists.....	---	1
Cotton dust (raw).....	---	1
Crag □ herbicide.....	---	15
Cresol (all isomers) - Skin.....	5	22
Crotonaldehyde.....	2	6
Cumene - Skin.....	50	245
Cyanide (as CN) - Skin.....	---	5
Cyanogen.....	10	20
Cyclohexane.....	300	1,050
Cyclohexanol.....	50	200
Cyclohexanone.....	50	200
Cyclohexene.....	300	1,015
Cyclopentadiene.....	75	200
2,4-D.....	---	10
DDT - Skin.....	---	1
DDVP, see Dichlorvos		
Decaborane - Skin.....	0.05	0.3
Demeton □ - Skin.....	---	0.1
Diacetone alcohol (4-hydroxy-4-methyl-2-pentanone).....	50	240
1,2-diaminoethane, see Ethylenediamine		
Diazomethane.....	0.2	0.4
Diborane.....	0.1	0.1
1,2-dibromoethane, see Ethylene dibromide, Table II		
Dibutyl phosphate.....	1	5
Dibutylphthalate.....	---	5
C Dichloroacetylene.....	0.1	0.4
C o-Dichlorobenzene.....	50	300
p-Dichlorobenzene.....	75	450
Dichlorodifluoromethane.....	1,000	4,950
1,3-Dichloro-5,5-dimethyl hydantoin.....	---	0.2
1,1-Dichloroethane.....	100	400
1,2-Dichloroethane, see Ethylene dichloride, Table III		

Air Contaminant	ppm	mg/m ³
1,2-Dichloroethylene.....	200	790
C Dichloroethyl ether - Skin.....	15	90
Dichloromethane, see Methylenechloride		
Dichloromonofluoromethane.....	1,000	4,200
C 1,1-Dichloro-1-nitroethane.....	10	60
1,2-Dichloropropane, see Propylenedichloride		
Dichlorotetrafluoroethane.....	1,000	7,000
Dichlorvos (DDVP) - Skin.....	---	1
Dieldrin - Skin.....	---	0.25
Diethylamine.....	25	75
Diethylamino ethanol - Skin.....	10	50
C Diethylene triamine - Skin.....	10	42
Diethylether, see Ethyl ether		
Difluorodibromomethane.....	100	860
C Diglycidyl ether (DGE).....	0.5	2.8
Dihydroxybenzene, see Hydroquinone		
Diisobutyl ketone.....	50	290
Diisopropylamine - Skin.....	5	20
Dimethoxymethane, see Methylal		
Dimethyl acetamide - Skin.....	10	35
Dimethylamine.....	10	18
Dimethylaminobenzene, see Xylidene		
Dimethylaniline (N-dimethylaniline) - Skin...	5	25
Dimethylbenzene, see Xylene		
Dimethyl 1,2-dibromo-2,2-dichloroethyl phosphate, (Dibrom).....	---	3
Dimethylformamide - Skin.....	10	30
2,6-Dimethylheptanone, see Diisobutyl ketone		
1,1-Dimethylhydrazine - Skin.....	0.5	1
Dimethylphthalate.....	---	5
Dimethylsulfate - Skin.....	1	5
Dinitrobenzene (all isomers) - Skin.....	---	1
Dinitro-o-cresol - Skin.....	---	0.2
Dinitrotoluene - Skin.....	---	1.5
Dioxane (Diethylene dioxide) - Skin.....	100	360
Diphenyl.....	0.2	1
Diphenylmethane diisocyanate, see Methylene bisphenyl isocyanate (MDI)		
Dipropylene glycol methyl ether - Skin.....	100	600
Di-sec, octyl phthalate (di-2-ethyl- hexylphthalate).....	---	5
Endosulfan (Thiodan □).....	---	0.1
Endrin - Skin.....	---	0.1

Air Contaminant	ppm	mg/m ³
Epichlorhydrin - Skin.....	5	19
EPN - Skin.....	---	0.5
1,2-Epoxypropane, see Propyleneoxide		
2,3-Epoxy-1-propanol, see Glycidol		
Ethanethiol, see Ethylmercaptan		
Ethanolamine.....	3	6
2-Ethoxyethanol - Skin.....	200	740
2-Ethoxyethylacetate (Cellosolve acetate) - Skin.....	100	540
Ethyl acetate.....	400	1,400
Ethyl acrylate - Skin.....	25	100
Ethyl alcohol (ethanol).....	1,000	1,900
Ethylamine.....	10	18
Ethyl sec-amyl ketone (5-methyl-3-heptanone).	25	130
Ethyl benzene.....	100	435
Ethyl bromide.....	200	890
Ethyl butyl ketone (3-Heptanone).....	50	230
Ethyl chloride.....	1,000	2,600
Ethyl ether.....	400	1,200
Ethyl formate.....	100	300
C Ethyl mercaptan.....	10	25
Ethyl silicate.....	100	850
Ethylene chlorohydrin - Skin.....	5	16
Ethylenediamine.....	10	25
C Ethylene glycol dinitrate and/or Nitroglycerin - Skin.....	0.2	1
Ethylene glycol monomethyl ether acetate, see Methyl cellosolve acetate		
Ethylene imine - Skin.....	0.5	1
Ethylene oxide.....	50	90
Ethylidene chloride, see 1,1-Dichloroethane		
N-Ethylmorpholine - Skin.....	20	94
Ferbam.....	---	15
Ferrovandium dust.....	---	1
Fluoride (as F).....	---	2.5
Fluorine.....	0.1	0.2
Fluorotrichloromethane.....	1,000	5,600
Formic acid.....	5	9
Furfural - Skin.....	5	20
Furfuryl alcohol.....	50	200
Glycidol (2,3-Epoxy-1-propanol).....	50	150
Glycol monoethyl ether, see 2-Ethoxyethanol		
Guthion □, see Azinphosmethyl		

Air Contaminant	ppm	mg/m ³
Hafnium.....	---	0.5
Heptachlor - Skin.....	---	0.5
Heptane (n-heptane).....	500	2,000
Hexachloroethane - Skin.....	1	10
Hexachloronaphthalene - Skin.....	---	0.2
Hexane (n-hexane).....	500	1,800
2-Hexanone.....	100	410
Hexone (Methyl isobutyl ketone).....	100	410
sec-Hexyl acetate.....	50	300
Hydrazine - Skin.....	1	1.3
Hydrogen bromide.....	3	10
C Hydrogen chloride.....	5	7
Hydrogen cyanide - Skin.....	10	11
Hydrogen fluoride.....	3	2
Hydrogen peroxide (90%).....	1	1.4
Hydrogen selenide.....	0.05	0.2
Hydroquinone.....	---	2
Indene.....	10	45
Indium and compounds, as In.....		0.1
C Iodine.....	0.1	1
Iron oxide fume.....	---	10
Iron salts, soluble as Fe.....	---	1
Isoamyl acetate.....	100	525
Isoamyl alcohol.....	100	360
Isobutyl acetate.....	150	700
Isobutyl alcohol.....	100	300
Isophorone.....	25	140
Isoprophyl acetate.....	250	950
Isoprophyl alcohol.....	400	980
Isopropylamine.....	5	12
Isopropylether.....	500	2,100
Isopropyl glycidyl ether (IGE).....	50	240
Ketene.....	0.5	0.9
Lead.....	---	0.15
Lead arsenate.....	---	0.15
Lindane - Skin.....	---	0.5
Lithium hydride.....	---	0.025
L.P.G. (Liquified petroleum gas).....	1,000	1,800
Magnesium oxide fume.....	---	15
Malathion - Skin.....	---	15
Maleic anhydride.....	0.25	1
C Manganese.....	---	5
Mesityl oxide.....	25	100

Air Contaminant	ppm	mg/m ³
Methanethiol, see Methyl mercaptan		
Methoxychlor.....	---	15
2-Methoxyethanol, see Methyl cellosolve		
Methyl acetate.....	200	610
Methyl acetylene (propyne).....	1,000	1,650
Methyl acetylene-propadiene mixture (MAPP)...	1,000	1,800
Methyl acrylate - Skin.....	10	35
Methylal (dimethoxymethane).....	1,000	3,100
Methyl alcohol (methanol).....	200	260
Methylamine.....	10	12
Methyl amyl alcohol, see Methyl isobutyl carbinol		
Methyl (n-amyl) ketone (2-Heptanone).....	100	465
C Methyl bromide - Skin.....	20	80
Methyl butyl ketone, see 2-Hexanone		
Methyl cellosolve - Skin.....	25	80
Methyl cellosolve acetate - Skin.....	25	120
Methyl chloroform.....	350	1,900
Methylcyclohexane.....	500	2,000
Methylcyclohexanol.....	100	470
o-Methylcyclohexanone - Skin.....	100	460
Methyl ethyl ketone (MEK), see 2-Butanone		
Methyl formate.....	100	250
Methyl iodide - Skin.....	5	28
Methyl isoamyl ketone.....	100	475
Methyl isobutyl carbinol - Skin.....	25	100
Methyl isobutyl ketone, see Hexone		
Methyl isocyanate - Skin.....	0.02	0.05
C Methyl mercaptan.....	10	20
Methyl methacrylate.....	100	410
Methyl propyl ketone, see 2-Pentanone		
C a-Methyl styrene.....	100	480
C Methylene bisphenyl isocyanate (MDI).....	0.02	0.2
Molybdenum:		
Soluble compounds.....	---	5
Insoluble compounds.....	---	15
Monomethyl aniline - Skin.....	2	9
C Monomethyl hydrazine - Skin.....	0.2	0.35
Morpholine - Skin.....	20	70
Naphtha (coaltar).....	100	400
Naphthalene.....	10	50
Nickel carbonyl.....	0.001	0.007
Nickel, metal and soluble cmpds, as Ni.....	---	1

Air Contaminant	ppm	mg/m ³
Nicotine - Skin.....	---	0.5
Nitric acid.....	2	5
Nitric oxide.....	25	30
p-Nitroaniline - Skin.....	1	6
Nitrobenzene - Skin.....	1	5
p-Nitrochlorobenzene - Skin.....	---	1
Nitroethane.....	100	310
Nitrogen dioxide.....	5	9
Nitrogen trifluoride.....	10	29
Nitroglycerin - Skin.....	0.2	2
Nitromethane.....	100	250
1-Nitropropane.....	25	90
2-Nitropropane.....	25	90
Nitrotoluene - Skin.....	5	30
Nitrotrichloromethane, see Chloropicrin		
Octachloronaphthalene - Skin.....	---	0.1
Octane.....	500	2,350
Oil mist, mineral.....	---	5
Osmium tetroxide.....	---	0.002
Oxalic acid.....	---	1
Oxygen difluoride.....	0.05	0.1
Ozone.....	0.1	0.2
Paraffin wax fume.....	---	0.2
Paraquat - Skin.....	---	0.5
Parathion - Skin.....	---	0.1
Pentaborane.....	0.005	0.01
Pentachloronaphthalene - Skin.....	---	0.5
Pentachlorophenol - Skin.....	---	0.5
Pentane.....	1,000	2,950
2-Pentanone.....	200	700
Perchloroethylene, see Tetrachloroethylene, Table III		
Perchloromethyl mercaptan.....	0.1	0.8
Perchloryl fluoride.....	3	13.5
Petroleum distillates (naphtha).....	500	2,000
Phenol - Skin.....	5	19
p-Phenylene diamine - Skin.....	---	0.1
Phenyl ether (vapor).....	1	7
Phenyl ether-biphenyl mixture (vapor).....	1	7
Phenylethylene, see Styrene		
Phenyl glycidyl ether (PGE).....	10	60
Phenylhydrazine - Skin.....	5	22
Phosdrin (Mevinphos □) - Skin.....	---	0.1

Air Contaminant	ppm	mg/m ³
Phosgene (carbonyl chloride).....	0.1	0.4
Phosphine.....	0.3	0.4
Phosphoric acid.....	---	1
Phosphorus (yellow).....	---	0.1
Phosphorus pentachloride.....	---	1
Phosphorus pentasulfide.....	---	1
Phosphorus trichloride.....	0.5	3
Phthalic anhydride.....	2	12
Picric acid - Skin.....	---	0.1
Pival □ (2-Pivalyl-1,3-indandione).....	---	0.1
Platinum (Soluble salts) as Pt.....	---	0.002
Propargyl alcohol - Skin.....	1	---
Propane.....	1,000	1,800
n-Propyl acetate.....	200	840
Propyl alcohol.....	200	500
n-Propyl nitrate.....	25	110
Propylene dichloride.....	75	350
Propylene imine - Skin.....	2	5
Propylene oxide.....	100	240
Propyne, see Methylacetylene		
Pyrethrum.....	---	5
Pyridine.....	5	15
Quinone.....	0.1	0.4
RDX - Skin.....	---	1.5
Rhodium, Metal fume and dusts, as Rh.....	---	0.1
Soluble salts.....	---	0.001
Ronnel.....	---	10
Rotenone (commercial).....	---	5
Selenium compounds (as Se).....	---	0.2
Selenium hexafluoride.....	0.05	0.4
Silver, metal and soluble compounds.....	---	0.01
Sodium fluoroacetate (1080) - Skin.....	---	0.05
Sodium hydroxide.....	---	2
Stibine.....	0.1	0.5
Stoddard solvent.....	500	2,950
Strychnine.....	---	0.15
Sulfur dioxide.....	5	13
Sulfur hexafluoride.....	1,000	6,000
Sulfuric acid.....	---	1
Sulfur monochloride.....	1	6
Sulfur pentafluoride.....	0.025	0.25
Sulfuryl fluoride.....	5	20
Systox, see Demeton □		

Air Contaminant	ppm	mg/m ³
2,4,5-T.....	---	10
Tantalum.....	---	5
TEDP - Skin.....	---	0.2
Tellurium.....	---	0.1
Tellurium hexafluoride.....	0.02	0.2
TEPP - Skin.....	---	0.05
C Terphenyls.....	1	9
1,1,1,2-Tetrachloro-2,2-difluoroethane.....	500	4,170
1,1,2,2-Tetrachloro-1,2-difluoroethane.....	500	4,170
1,1,2,2-Tetrachloroethane - Skin.....	5	35
Tetrachloromethane, see Carbon tetrachloride		
Tetrachloronaphthalene - Skin.....	---	2
Tetraethyl lead (as Pb) - Skin.....	---	0.075
Tetrahydrofuran.....	200	590
Tetramethyl lead (as Pb) - Skin.....	---	0.075
Tetramethyl succinonitrile - Skin.....	0.5	3
Tetranitromethane.....	1	8
Tetryl (2,4,6-trinitrophenyl- methyl nitramine) - Skin.....	---	1.5
Thallium (soluble compounds) - Skin as Tl....	---	0.1
Thiram.....	---	5
Tin (inorganic compds, except oxides).....	---	2
Tin (organic compounds).....	---	0.1
C Toluene-2,4-diisocyanate.....	0.02	0.14
o-Toluidine - Skin.....	5	22
Toxaphene, see Chlorinated camphene		
Tributyl phosphate.....	---	5
1,1,1-Trichloroethane, see Methyl chloroform		
1,1,2-Trichloroethane - Skin.....	10	45
Titanium dioxide.....	---	15
Trichloromethane, see Chloroform		
Trichloronaphthalene - Skin.....	---	5
1,2,3-Trichloropropane.....	50	300
1,1,2-Trichloro 1,2,2-trifluoroethane.....	1,000	7,600
Triethylamine.....	25	100
Trifluoromonobromomethane.....	1,000	6,100
Trimethyl benzene.....	25	120
2,4,6-Trinitrophenol, see Picric acid		
2,4,6-Trinitrophenylmethyl nitramine, see Tetryl		
Trinitrotoluene - Skin.....	---	1.5
Triorthocresyl phosphate.....	---	0.1
Triphenyl phosphate.....	---	3

Air Contaminant	ppm	mg/m ³
Tungsten and compounds, as W Soluble.....	---	1
Insoluble.....	---	5
Turpentine.....	100	560
Uranium (soluble compounds).....	---	0.05
Uranium (insoluble compounds).....	---	0.25
C Vanadium:		
V ₂ O ₅ dust.....	---	0.5
V ₂ O ₅ fume.....	---	0.1
Vinyl benzene, see Styrene		
Vinylcyanide, see Acrylonitrile		
Vinyl toluene.....	100	480
Warfarin.....	---	0.1
Wood dust.....	---	5
Xylene (xylol).....	100	435
Xylidine - Skin.....	5	25
Yttrium.....	---	1
Zinc chloride fume.....	---	1
Zinc oxide fume.....	---	5
Zirconium compounds (as Zr).....	---	5

TABLE II

Air Contaminant	8-hour time weighted average	Acceptable ceiling concentration	Acceptable maximum peak above the acceptable ceiling concentration <u>for an 8-hour shift</u>	
			Concentration	Maximum duration
Benzene	10 ppm	25 ppm	50 ppm	10 minutes
Beryllium and beryllium compounds	2 $\mu\text{g}/\text{m}^3$	5 $\mu\text{g}/\text{m}^3$	25 $\mu\text{g}/\text{m}^3$	30 minutes
Cadmium dust	0.2 mg/m^3	0.6 mg/m^3		
Cadmium fume	0.1 mg/m^3	0.3 mg/m^3		
Carbon disulfide	20 ppm	30 ppm	100 ppm	30 minutes
Carbon tetrachloride	10 ppm	25 ppm	200 ppm	5 minutes in any 4 hours
Chromic acid and chromates		0.1 mg/m^3		
Ethylene dibromide	20 ppm	30 ppm	50 ppm	5 minutes
Ethylene dichloride	50 ppm	100 ppm	200 ppm	5 minutes in any 3 hours
Formaldehyde	3 ppm	5 ppm	10 ppm	30 minutes
Hydrogen sulfide	10 ppm	20 ppm	50 ppm	10 minutes once only if no other measurable exposure occurs
Mercury		0.1 mg/m^3		
Mercury, organo (alkyl)	0.01 mg/m^3	0.04 mg/m^3		
Methyl chloride	100 ppm	200 ppm	300 ppm	5 minutes in any 3 hours
Methylene chloride	500 ppm	1,000 ppm	2,000 ppm	5 minutes in any 2 hours
Styrene	100 ppm	200 ppm	600 ppm	5 minutes in any 3 hours
Tetrachloroethylene	100 ppm	200 ppm	300 ppm	5 minutes in any 3 hours
Toluene	200 ppm	300 ppm	500 ppm	10 minutes
Trichloroethylene	100 ppm	200 ppm	300 ppm	5 minutes in any 2 hours

TABLE III - MINERAL DUSTS

Air Contaminant	Millions of particles per cubic foot of air (mppcf) ^e		Milligrams per cubic meter (mg/m ³)
Silica:			
Crystalline:			
Quartz (respirable)	250	10 mg/m ³	
	%SiO ₂ + 5	% SiO ₂ + 2	
Quartz (total dust)		30 mg/m ³	
		% S ₂ O ₂ + 2	
Cristobalite: Use 1/2 the value calculated from the count or mass formulae for quartz.			
Tridymite: Use 1/2 the value calculated from the formulae for quartz.			
Amorphous, including natural diatomaceous earth	20	80 mg/m ³	% SiO ₂
Silicates (less than 1% crystalline silica):			
Mica	20		
Soapstone	20		
Talc (non-asbestos form)	20		
Talc (fibrous). Use asbestos limit.			
Tremolite (see talc, fibrous)			
Portlant cement	50		
Graphite (natural)	15		
Coal dust (respirable fraction less than 5% SiO ₂)		2.4 mg/m ³	
		or	
For more than 5% SiO ₂		10 mg/m ³	
		% SiO ₂ + 2	
Inert or Nuisance Dust:			
Respirable fraction	15	5 mg/m ³	
Total dust	50	15 mg/m ³	
Fibers per cubic centimeters (f/cm ³)			
Asbestos (all types)			
(asbestos fibers = asbestos fibers longer than 5 micrometers)			
	2		

(History: 50-70-106, 50-70-113, MCA; IMP, 50-70-103, 50-70-106, 50-70-113, MCA; AMD, 1980 MAR p. 3008, Eff. 12/12/80; TRANS, from DHES, 1996 MAR p. 433.)

Sub-Chapter 2 reserved

